

**The invention claimed is:**

1. A control arrangement for controlling the operation of a work implement carried on a work vehicle, comprising:

a first control lever, a first hydraulic system, and a first hydraulic cylinder, said first control lever operatively connected to said first hydraulic system, said first control lever arranged to be moved by an operator in a first direction or in a second direction, to control two-way movement of said first hydraulic cylinder by routing pressurized hydraulic fluid from said first hydraulic system to a respective extend or retract port of said first hydraulic cylinder;

a second control lever, a second hydraulic system, and a second hydraulic cylinder, said second control lever operatively connected to said second hydraulic system, said second control lever arranged to be moved by an operator in a third direction or in a fourth direction, to control two-way movement of said second hydraulic cylinder by routing pressurized hydraulic fluid from said second hydraulic system to a respective extend or retract port of said second hydraulic cylinder;

said first and second hydraulic cylinders configured and arranged to position different portions of a work implement of a work vehicle;

third and fourth hydraulic systems;

a control switch and at least one electrically operated valve block, said electrically-operated valve block electrically connected to a source of power and to said control switch, and hydraulically connected to said first and second hydraulic systems such that changing the state of said control switch charges the state of said electrically operated valve block to operatively connect said first and second control levers to said

third and fourth hydraulic systems respectively, wherein said first control lever is arranged to be moved by an operator in said first direction or in said second direction, to control two-way movement of said second hydraulic cylinder by routing pressurized hydraulic fluid from said third hydraulic system to a respective extend or retract port of said second hydraulic cylinder, and wherein said second control lever is arranged to be moved by an operator in said third direction or in said fourth direction, to control two-way movement of said first hydraulic cylinder by routing pressurized hydraulic fluid from said fourth hydraulic system to a respective extend or retract port of said first hydraulic cylinder.

2. The control arrangement according to claim 1, wherein said third and fourth hydraulic systems comprise reconfigured, common hydraulic components with said first and second hydraulic systems.

3. The control arrangement according to claim 1, wherein said first and second directions are opposite directions, and said third and fourth directions are opposite directions.

4. The control arrangement according to claim 1, further comprising a third hydraulic cylinder arranged to position a third portion of said implement, and a fourth hydraulic cylinder arranged to position a fourth portion of said implement,

wherein when said first control lever is operatively connected to either said first hydraulic system or said third hydraulic system, said first control lever is arranged to be

moved by an operator in a fourth direction or in a fifth direction that are different from said first and second directions, to control two-way movement of said third hydraulic cylinder by routing pressurized hydraulic fluid from either said first hydraulic system or said third hydraulic system to a respective extend or retract port of said third hydraulic cylinder; and

wherein when said second control lever is operatively connected to either said second hydraulic system or said fourth hydraulic system, said second control lever is arranged to be moved by an operator in a seventh direction or in an eighth direction that are different from said third and fourth directions, to control two-way movement of said fourth hydraulic cylinder by routing pressurized hydraulic fluid from either said second hydraulic system or said fourth hydraulic system to a respective extend or retract port of said fourth hydraulic cylinder;

wherein said fifth and sixth directions are opposite directions and said seventh and eighth directions are opposite directions, and said fifth direction is perpendicular to said first direction and said seventh direction is perpendicular to said third direction.

5. The control arrangement according to claim 4, wherein said work implement is a backhoe having a swing frame, a boom, a dipperstick and a bucket, the swing frame being pivotally mounted to a supporting structure about a vertical pivot axis, the boom being pivotally coupled to the swing frame about a horizontal pivot axis, the dipperstick is pivotally mounted to the boom about a horizontal axis, the bucket is pivotally mounted to the dipperstick about a horizontal axis, wherein said first hydraulic cylinder is connected between said boom and said swing frame, said second hydraulic

cylinder is connected between said dipperstick and said boom, said third hydraulic cylinder is connected between said supporting structure and said swing frame, and said fourth hydraulic cylinder is connected between said bucket and said dipperstick.

5           6.       The control arrangement according to claim 1, wherein said work  
implement is a backhoe having a swing frame, a boom, a dipperstick and a bucket, the  
swing frame being pivotally mounted to a supporting structure about a vertical pivot  
axis, the boom being pivotally coupled to the swing frame about a horizontal pivot axis,  
the dipperstick is pivotally mounted to the boom about a horizontal axis, the bucket is  
10       pivotally mounted to the dipperstick about a horizontal axis, wherein said first hydraulic  
cylinder is connected between said boom and said swing frame, said second hydraulic  
cylinder is connected between said dipperstick and said boom.

             7.       The control arrangement according to claim 1, wherein said work vehicle  
15       comprises an operator's cab wherein said operator can operate said first and second  
levers, and wherein said control switch is located within said operator's cab of said work  
vehicle.

             8.       The control arrangement according to claim 1, wherein said electrically  
20       operated valve block comprises at least one solenoid valve having a spool that is shifted  
by electrical power routed through said control switch.

9. The control arrangement according to claim 1, wherein said first hydraulic system comprises at least one first pilot operated valve hydraulically connected to a first spool valve that is hydraulically connected to said extend and retract ports of said first hydraulic cylinder, and said third hydraulic system comprises said at least one first pilot  
5 operated valve hydraulically connected to a second spool valve that is hydraulically connected to said extend and retract ports of said second hydraulic cylinder, said at least one first pilot operated valve mechanically adjusted by said first control lever,

wherein said second hydraulic system comprises at least one second pilot operated valve hydraulically connected to said second spool valve that is hydraulically  
10 connected to said extend and retract ports of said second hydraulic cylinder, and said fourth hydraulic system comprises said at least one second pilot operated valve hydraulically connected to said first spool valve that is hydraulically connected to said extend and retract ports of said first hydraulic cylinder, said at least one second pilot operated valve mechanically adjusted by said second control lever.

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10. A work vehicle having a backhoe, the backhoe having a pivotal boom, a dipperstick pivotally connected to the boom, and a bucket, comprising:

a first control lever, a first hydraulic system, and a first hydraulic cylinder, said first control lever operatively connected to said first hydraulic system, said first control  
20 lever arranged to be moved by an operator in a first direction or in a second direction, to control two-way movement of said first hydraulic cylinder by routing pressurized hydraulic fluid from said first hydraulic system to a respective extend or retract port of said first hydraulic cylinder;

a second control lever, a second hydraulic system, and a second hydraulic cylinder, said second control lever operatively connected to said second hydraulic system, said second control lever arranged to be moved by an operator in a third direction or in a fourth direction, to control two-way movement of said second hydraulic cylinder by routing pressurized hydraulic fluid from said second hydraulic system to a  
5 respective extend or retract port of said second hydraulic cylinder;

said first and second hydraulic cylinders configured and arranged to pivot said boom and said dipperstick respectively;

third and fourth hydraulic systems;

10 a control switch and at least one electrically operated valve block, said electrically-operated valve block electrically connected to a source of power and to said control switch, and hydraulically connected to said first and second hydraulic systems such that changing the state of said control switch charges the state of said electrically operated valve block to operatively connect said first and second control levers to said  
15 third and fourth hydraulic systems respectively, wherein said first control lever is arranged to be moved by an operator in said first direction or in said second direction, to control two-way movement of said second hydraulic cylinder by routing pressurized hydraulic fluid from said third hydraulic system to a respective extend or retract port of said second hydraulic cylinder, and wherein said second control lever is arranged to be  
20 moved by an operator in said third direction or in said fourth direction, to control two-way movement of said first hydraulic cylinder by routing pressurized hydraulic fluid from said fourth hydraulic system to a respective extend or retract port of said first hydraulic cylinder.

11. The work vehicle according to claim 10, wherein said third and fourth hydraulic systems comprise reconfigured, common hydraulic components with said first and second hydraulic systems.

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12. The work vehicle according to claim 10, wherein said first and second directions are opposite directions, and said third and fourth directions are opposite directions.

10 13. The work vehicle according to claim 10, wherein said boom is pivotally connected to a swing frame about a horizontal axis, said swing frame is pivotally connected to said work vehicle about a vertical axis, further comprising a third hydraulic cylinder arranged to move swing said swing frame, and wherein said bucket is pivotally connected to said dipperstick, further comprising a fourth hydraulic cylinder arranged to  
15 curl and uncurl said bucket,

wherein when said first control lever is operatively connected to either said first hydraulic system or said third hydraulic system, said first control lever is arranged to be moved by an operator in a fourth direction or in a fifth direction that are different from said first and second directions, to control two-way movement of said third hydraulic  
20 cylinder by routing pressurized hydraulic fluid from either said first hydraulic system or said third hydraulic system to a respective extend or retract port of said third hydraulic cylinder;

wherein when said second control lever is operatively connected to either said second hydraulic system or said fourth hydraulic system, said second control lever is arranged to be moved by an operator in a seventh direction or in an eighth direction that are different from said third and fourth directions, to control two-way movement of said fourth hydraulic cylinder by routing pressurized hydraulic fluid from either said second hydraulic system or said fourth hydraulic system to a respective extend or retract port of said fourth hydraulic cylinder; and

wherein said fifth and sixth directions are opposite directions and said seventh and eighth directions are opposite directions, and said fifth direction is perpendicular to said first direction and said seventh direction is perpendicular to said third direction.

14. The work vehicle according to claim 10, wherein said work vehicle comprises an operator's cab wherein said operator can operate said first and second levers, and wherein said control switch is located within said operator's cab of said work vehicle.

15. The work vehicle according to claim 10, wherein said electrically operated valve comprises at least one solenoid valve having a spool that is shifted by electrical power routed through said control switch.

16. The work vehicle according to claim 10, wherein said first hydraulic system comprises at least one first pilot operated valve hydraulically connected to a first spool valve that is hydraulically connected to said extend and retract ports of said first



hydraulic cylinder, and said third hydraulic system comprises said at least one first pilot operated valve hydraulically connected to a second spool valve that is hydraulically connected to said extend and retract ports of said second hydraulic cylinder, said at least one first pilot operated valve mechanically adjusted by said first control lever,

5            wherein said second hydraulic system comprises at least one second pilot operated valve hydraulically connected to said second spool valve that is hydraulically connected to said extend and retract ports of said second hydraulic cylinder, and said fourth hydraulic system comprises said at least one second pilot operated valve hydraulically connected to said first spool valve that is hydraulically connected to said  
10 extend and retract ports of said first hydraulic cylinder, said at least one second pilot operated valve mechanically adjusted by said second control lever.

17.    The work vehicle according to claim 16, wherein said work vehicle comprises an operator's cab wherein said operator can operate said first and second  
15 levers, and wherein said control switch is located within said operator's cab of said work vehicle.

18.    The work vehicle according to claim 17, wherein said electrically operated valve block comprises at least one solenoid valve having a spool that is shifted by  
20 electrical power routed through said control switch.

19.    The work vehicle according to claim 17, wherein said work vehicle comprises an operator's seat within said operator's cab and wherein said operator can

operate said first and second levers while seated in said seat, and wherein said control switch is located within said operator's cab of said work vehicle sufficiently close to said operator's seat such that an operator can reach said switch while seated in said seat.